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ABSTRACT

In order to determine student attitudes and the effectiveness of computer-assisted instruction, an introductory psychology class at Northern Arizona University participated in a study identifying which students preferred such instruction, and whether it made a difference in class performance. The sample consisted of 165 students, predominantly white females. The course syllabus provided several different credit options including traditional quizzes and study guides, computer- and video-based assignments, and numerous interactive projects. Prior to making preferential selections, students participated in orientations for the various technical resources on campus. The majority of the class opted for traditional course options and community service activities, and very few selected video, book review, and experimental options. The vast majority of students who chose the electronic options were young white males and Native Americans. Those least likely to choose electronic options were older Hispanic females. Though most students selected traditional options, course evaluations were much more positive than in the previous semester. However, there was no notable difference in overall performance within choice groups. It is likely that openness to change and previous experience with computers are important influences on students' comfort level with electronic learning. Contains 15 references. (YKH)

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Running Head: STUDENT PREFERENCES FOR ELECTRONIC ASSIGNMENTS

Student Preferences for Electronically-Assisted Assignment Options to

Fulfill Course Requirements in a Community College

Introductory Psychology Class

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Abstract

Students (N=165) enrolled in Introductory Psychology were provided with a variety of assignment choices to fulfill course requirements. Choices included computerized tutorials, participation in electronic discussion groups and compiling information from the Worldwide Web as well as more traditional options such as quizzes and study guides. Students most likely to choose electronic options were young Anglo males and Native American students. Those least likely to choose electronic options were older Hispanic females. Incorporating electronic instructional options resulted in higher course evaluations, even though the majority of students opted for more traditional assignments. The patterns of choice evident in this study suggest a need to monitor instructional innovations utilizing computers to see if they differentially impact various groups and cohorts.

Student Preferences for Electronically Assisted Instructional
Assignment Options to Fulfill Course Requirements in a
Community College Introductory Psychology Class

As Forsyth and Archer (1997) note, advances in computer technology are changing the way professors teach psychology. Computerized tutorials, the World Wide Web and other alternative means of disseminating information are rapidly modifying course delivery, offering hope of enhancing student learning and motivation. Publishers now provide computerized tutorials and multimedia instructional support with most introductory psychology texts. Homepages and electronic discussion groups abound, providing new opportunities for class interaction.

Several preliminary studies (Chaparro & Halcomb, 1990; Chute, 1986; Kulik, Bangert & Williams, 1983; Petty & Rosen, 1990) offered modest support for the positive impact of new technologies on psychology instruction, although such evidence is not uniform. Some researchers (Sawyer, 1988; Welsh & Null, 1991) have found traditional means more effective.

It may be that a variety of individual differences among students, such as learning styles, previous experience with technologically-assisted instruction and factors related to socioethnic background and cohort are responsible for the mixed results noted above. Introducing students to psychology utilizing new technologies is a desirable goal, but as with all teaching strategies, certain types of students with particular

background experiences and learning styles may benefit more readily from electronic instruction than others.

This study investigates the issue of which students most benefit from electronically-assisted instruction by looking at how students choose to learn when given a variety of traditional and nontraditional instructional options. Three questions are addressed in the analysis of the data. First, which options are students were most likely to select? Second, how comfortable are students, overall, with the incorporation of electronically-assisted instructional options into a course? Last, is there any significant difference in performance of course requirements between students who chose primarily electronically-assisted assignments and those who chose more traditional assignments?

Method

Participants

Subjects included 165 students enrolled in one of four sections of PSY101 (Introductory Psychology) at a community college in a suburban southwestern setting. All sections were instructed during the same semester by the author. The sample was comprised of 103 female students and 62 male students. Age range was 18 to 62 years, with an average age of 28 years, mode of 21 years and median of 32 years. Ethnicity of sample reported was 59% Anglo-American, 30% Mexican American, 8% Black American, 2% Native American and 1% Asian American.

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The author had taught demographically similar sections of the same course for this college system without incorporating electronic instructional options over several semesters prior to the time of the study. Student grades and evaluations from similar courses taught the previous semester at the same campus were used for comparison in data analysis.

Procedure

Background. Prior to the semester when this study was conducted, grades in PSY101 had been assigned based on a point system. Points, up to a maximum of 500, were earned on the following assignments: (1) In-class quizzes over assigned textbook reading and lecture worth 100 points; (2) a group presentation, prepared with 2 or 3 other students, about one field of psychology (i.e., abnormal, developmental, educational, forensic, social, etc.), worth 50 points; (3) a formal paper with a minimum of 5 references, prepared according to specific guidelines, over a topic in psychology worth 100 points; (4) completion of the study guide and a series of crosswords which accompanied the textbook worth 100 points and (5) participation in a variety of in-class activities such as skits, experiments, panel discussions and movie reviews, worth 50 points.

Summative course evaluations, computed on a five point Likert-type scale, ranged from 3.6 - 4.1, with common complaints being the amount of work required, especially the study guide, and the number of quizzes. Common positive comments

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concerned the amount of learning which occurred, instructor enthusiasm, feeling well-prepared for the final exam and use of group activities in class.

For this study, the syllabus was modified to explain how points would be earned. Students were provided with the following written information on the first day of class:

Evaluation Procedures: Performance will be assessed and grades assigned based on points earned, out of 500 possible, for exams, written assignments, projects, class activities and presentations. Some of these assignments, worth up to 250 points, MUST be completed by ALL students. These required assignments include the final exam, a formal paper and group participation in a presentation. The remaining 250 points are available in a self-selected "smorgasbord" format. You may choose the options which will best meet your unique learning styles and schedule. Specifically, these include class quizzes, community service, study guide completion, computer-assisted instructional activities, crossword puzzles, written assignments and in-class activities. Point values for each appear below. Choose 250 points from the following assignments: 100 points: Quizzes over each unit will be given in class. Questions come from the computerized study bank, available to you in the lab, and from the Mastery Study Guide. Both mediums cover the same material and

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the same questions, so it is up to you how you prepare.

Since these quizzes serve as a study guide for the final, it is recommended that all students take them. However, it is up to you whether you use them only as informative pre-tests or as traditional quizzes which determine a portion of your grade for the course. If you choose quizzes as one of the components of your grade, you must take and turn in each quiz on the day it is given in class. The point value you earn, out of 100 possible, will be added to your grade.

50 points: Preparing a "WWW/Internet Surfer's Notebook" is an opportunity for you to explore the network in search of sources of information on psychology. You will need to find, reference and print out at least one related bit of information from the web for each unit we cover. For example, in our unit on Physiological Psychology, you might find and reproduce CAT scan data of a patient with a particular disorder we discuss from a medical data base. Your final product should be bound, indexed and well presented. You will also orally summarize the information to your instructor and a peer group and explain how it relates to each of the units. It is due by May 9.

50 points: Objectives and Exercises Study Crosswords may be completed throughout the semester. The booklet should be completed and turned in before the final exam on May 16 for checking and recording. For full credit, all crosswords must be done.

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50 points: Mastery Study Guide may be completed throughout the semester and turned in no later than May 9 for credit. For full credit, all items must be completed.

50 points: Computer Resources Evaluation Log will require you to sign in at the lab and use the CAI materials available for this course for a minimum of 15 hours each month. Each time you complete a segment of the program, you should complete a "formal evaluation sheet." These should be compiled into a folder, and accompanied by a brief statement indicating whether/how computers should be used to teach PSY101 in future classes. The crosswords and study guide explained above are available, as well as a variety of other tutorials. This is due by May 9, but may be turned in earlier.

50 points: Class activities which include a variety of role-plays, worksheets and other learning tasks, may be used to reach your total. These can only be done in class.

25 points: Video Resources Evaluation Log will require you to watch a minimum of 15 hours of instructional psychology videos. These may be checked out through video services/library for on-campus viewing, copied for home viewing if you provide the tape and/or accessed on educational television. Each time you view a program, you should complete a "formal evaluation sheet." These should be compiled into a folder, and accompanied by a brief statement indicating whether/how videos should be

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used to teach PSY101 in future classes.

50 points: Written Assignments and Reviews as explained on the sheet provided in class include book reviews, article reviews and interviews with psychology professionals. These should be turned in together, in a folder, by April 18.

25 points: Into the Streets service learning, scheduled in late February on a Saturday, accompanied by a card verifying your participation and a brief paper summarizing how a knowledge of psychology would be helpful in the area in which you served, fulfills this.

25 points: Producing a teaching video prepared for future students to learn about a particular topic from and produced by YOU is a fun way to get points. You may check out equipment for this through AV; this assignment can be completed with a group or individually.

25 points: On-line forum participation, including thoughtful answers to 5 or more questions presented on line by your peers or instructor, meets this requirement. Forum will be monitored throughout the semester.

25 points: Design an experiment which could help to answer an important question in psychology. I'm looking for careful thought and scientific rigor on this; evaluation criteria will be very high. Definitely consult your instructor if you choose this option. It is due by April 25. Remember, you must complete the paper, group project and final. Then, you must choose and contract for

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an additional 250 points from the list above. You must complete the assignments you contract for; your course percentage will be based on scores on those assignments. Any assignments NOT contracted for may be completed for extra credit, to a maximum value of 50 points. Consider your own strengths, schedules and learning styles when you decide on your contract. A few examples of selections follow, but you are not limited to these.

Examples of various ways students could combine assignments for points were then provided. Prior to completing the contract, all students received an orientation to the computer lab, practice participating in on-line chats and an activity which required finding information on WWW, a chance to use the CAI materials available and a library orientation. All students had access to required computer facilities and the Web on and off campus for a fee of \$5.00 per semester. Waivers were also available.

Measures

Once contracts were returned, student choices were recorded in the instructor's grade book. Demographic information for each participant was also available via college records.

At the conclusion of the semester, students completed a standard course evaluation which utilized a five-point scale to rate several dimensions of instruction. The evaluation was identical to that used in previous semesters. In addition, to completing the evaluation, each student responded to the question: "How comfortable were you with the availability of

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electronic as well as traditional instructional options for earning points in this course?"

Student grades for the paper, group presentation, final exam and overall course point total were also recorded, and compared to student performance on these items in previous semesters.

Results

Student Choices

The following graphs compare the overall percentage of students who chose each of the available options. The graphs are grouped as: (1) "traditional" options, which represent those required of all students in previous semesters; (2) "electronic" options which include those which required computer access to complete; (3) "video" options, which include those which required watching or taping video recordings, and (4) "other" options, which include service learning, experiments and book/article reviews. The classwork option was selected by the largest number of students, so it appears in each graph for means of direct comparison. It is interesting to note that the majority of students opted for the more traditional options which had been required in previous semesters, namely class activities, quizzes and study guide activities.

Fewer students selected video options, book reviews and experiments than any other choices. This may have been because no formal orientation for these options was provided within the class. On the other hand, many students opted for the service learning activity. This may have been because service

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learning was utilized extensively in many courses on this campus, and students were familiarized with it through other courses and campus-wide publicity.

Insert Figures 1 - 4 about here

Demographics within the electronic options category were of particular interest. Of the 23 students who selected "WWW Surfer's Notebook" as an assignment, 19 were male. All students who chose this option were under 26 years of age. All but three of the students who selected this option also participated in the on-line chat option. All Native American students in the sample participated in both of these options. No Mexican-American students selected the "Surfer's Notebook" as an option, and only two participated in the on-line discussion group.

Of the 35 students who participated in the on-line discussion group, 28 were male. All but four were under 30 years of age. Students who selected one or both of these options also chose to complete computerized tutorials, but several other students selected computerized tutorials, as well. Table 1 indicates gender and ethnicity of students who completed work in the electronically-assisted category.

Insert Table 1 about here

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As the table indicates, young Caucasian males and Native American students of both genders were the most likely to select electronic learning options. Older students, and Mexican-American females were the least likely to chose these avenues for learning.

These same patterns were evident in evaluations. All but five students responded favorably to the question : "How comfortable were you with the availability of electronic as well as traditional options for earning points in this course?" Even though many did not utilize any of the electronic options available, comments like "It is nice to be able to choose how I learn" and "This helps prepare us for the workplace and the future" were frequent. All of the five unfavorable responses came from female Mexican American students over the age of 40. These comments were: (1) "It isn't fair not to make everyone do all of the same assignments;" (2) "Younger students are better with computers. This might be good for them, but not for me;" (3) "I can't afford a computer at home and don't want to spend all my time at school in the computer lab, so I wasn't comfortable with it;" (4) "I wasn't comfortable; it was too different," and (5) "Like old-fashioned classes better."

The majority of students selected traditional options for course completion, but, as Table 2 indicates, course evaluations were much more positive ($X=4.6$) than in the previous semester.

Insert Table 2 about here

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No students enrolled during the semester in which options were available commented about excessive work, quizzes or study guides.

Despite favorable responses to being offered choices in learning, no differences in overall performance on the final exams, papers and group presentations between sections who participated in the instructional choice options and sections from previous semesters were evident. Within choice groups, few differences in performance were evident. Students who participated in quizzes did perform slightly better on the final exam, perhaps due to a practice effect. Students who selected electronic options also performed slightly better on the final exam, although this is not inconsistent with research (Duncan, 1991; Goolkasian, 1989; Marcoulides, 1990; Worthington, Welsh, Archer, Mindes & Forsyth, 1996) which suggests computer-based instruction improves test performance. Conversely, students who elected electronic options tended to perform slightly less well on papers and presentations, perhaps indicating that they were initially weaker students whose performance was enhanced via computerized instruction. This explanation is consistent with the findings of Skinner (1990) and Forsyth & Archer (1997) that poor students who utilize instructional technology show the greatest gains. A third possibility is that the group was primarily made up of Anglo males, and some research indicates that Anglo males perform better on standardized multiple-choice tests than other

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groups (see Anastasi, 1988). Tables 3 summarizes student performance data by choice group.

Insert Table 3 about here

Discussion

As with any teaching strategy, it appears some students are more receptive to computer-assisted instructional practices than others. It is likely that openness to change and amount of previous experience with computers may be important influences on students' comfort level with electronic learning.

This study suggests that younger students appear to be more likely to prefer computer-assisted instruction. There may be cogent developmental arguments dealing with openness to change vs. rigidity at various points of the lifespan which explain this (see Binstock & George, 1990). It is as likely, however, that these students have had more experience with computers in a school setting and at home as a learning tool than older students, and are therefore more comfortable with this medium due to experience.

The apparent preference of males over females for computerized instruction is less easily explained by this argument, unless computers are more frequently utilized at the high school and early college levels in math, science and

business classes than in other subjects--and these classes are often predominantly male. Arguments from gender psychology that males are more visual/spatial and mechanical in their learning preferences while females are more social, group-oriented and verbal (see Bee, 1994) may also be relevant. Data to support or negate this is not presented here, however. The data simply indicates that male students in this study were more likely than female students to choose electronically-assisted options.

Socioeconomic factors and cultural orientation to tradition may help to explain some of the ethnic differences apparent in comfort level with electronic instruction. It may be that those students who had the most positive previous experiences with use of computers in education were most likely to prefer it as an learning option. It could certainly be argued, based on knowledge of local public school practices in the area where this study was conducted, that Native Americans and young Anglos were the most likely groups to have extensive previous experience with computers in schools.

There are undoubtedly a variety of factors which influence the choices students make about their learning and the level of comfort they experience with technological innovations in a classroom setting. What this data illustrates is that not all students perceive equal benefits from computerized instruction and other innovative teaching techniques and that we, as instructors, need to conscientiously monitor our students'

reactions to new technologies as we integrate them into our courses so as not to inadvertently place any group or cohort of learners at a disadvantage based on their lack of prior experience with computerized instruction. Technology is changing the way students learn and the way professors teach. This change is likely a gradual, dynamic evolution. Hence, any analysis is impacted by a variety of local environmental, inter- and intra-subject factors. Computer-based instruction has received mixed reviews for this reason. As with any technology, it can be used for good or for ill--or serendipitously.

The one conclusion this study can safely assert is that systematically gathering and analyzing feedback from students about the use of technology in teaching is useful to prevent unintended side effects on any group. This study also suggests that careful analysis of varying success rates with distance learning and computerized instructional delivery by cohort, ethnicity, gender and socioeconomic background is warranted in future research. Meta-analyses of such data across many studies, as well as local comparisons, would provide valuable information to programs and instructors, and prevent disenfranchisement of particular groups in the educational arena.

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Notes

1. Research described herein was completed at Chandler-Gilbert Community College, Maricopa County Community College District, Chandler, Arizona. The author taught in the Maricopa County Community College District from 1988-1996. Special thanks are extended to Dean Petersen, Computer Lab Director, for his assistance and support.
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3. Correspondence concerning this article should be sent to Sherri McCarthy-Tucker, Educational Psychology, Counseling and Human Relations, PO. Box 6236, Northern Arizona University at Yuma, Yuma, AZ 85366; e-mail:sherri.mccarthy-tucker@nau.edu

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Figure 1

Percent of Students in PSY101 Selecting Traditional Options

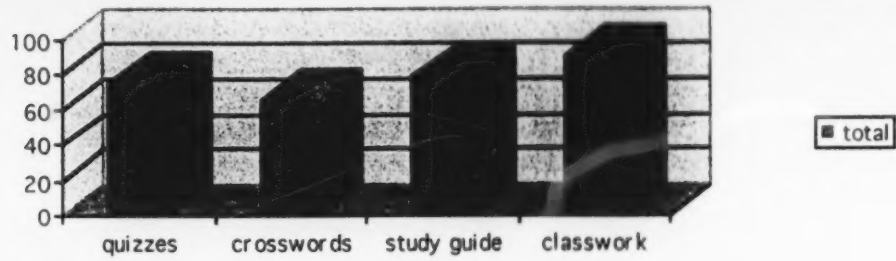


Figure 2

Percent of PSY101 Students Selecting Electronic Options

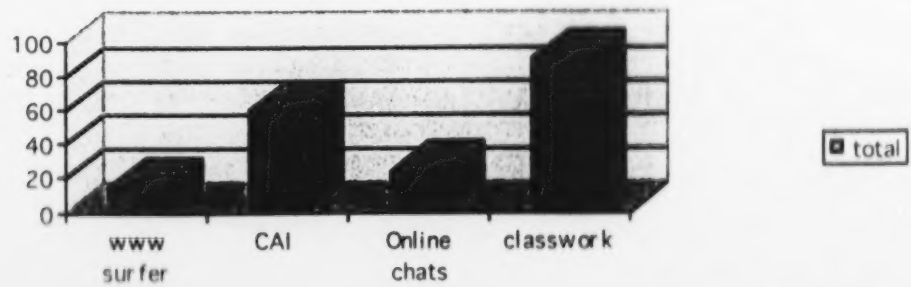


Figure 3

Percent of PSY101 Students Selecting Video Options

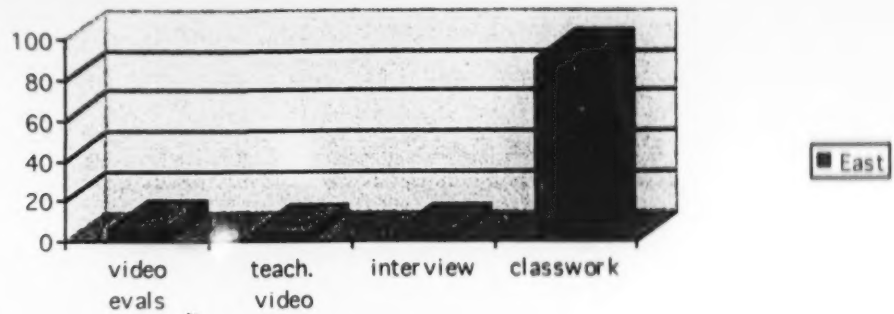
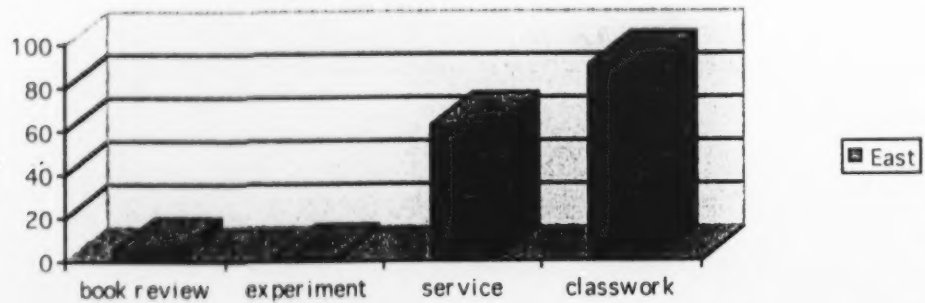


Figure 4

Percent of PSY101 Students Selecting Other Options



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Table 1

Gender and Ethnicity of Students Who Selected Assignments in the Electronic Options Categories

	<u>WWW Notebook</u>		<u>On-line Chats</u>		<u>CAI</u>		<u>Class Assignments</u>	
Gender	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
Mexican American	2	0	2	0	4	3	10	38
Native American	1	2	1	2	1	2	0	0
Black American	1	0	0	2	4	3	6	5
Anglo American	15	1	25	2	53	28	10	78
N	23		35		99		147	

Note. Total number of students in sample = 165. Total Male students=62. Total Female students=103. Total Mexican American students= 49. Total Native American students= 3. Total Black American students = 13. Total Anglo American students =101.

Table 2

Student Ratings of Dimensions of Instruction on a Five-point Scale of
PSY 101 Taught With Electronic Choice Options Compared to PSY101
Taught Without Electronic Choice Options the Previous Semester

Dimension	With Options	Without Options
	<u>Spring Semester</u>	<u>Fall Semester</u>
Overall course effectiveness	4.6	4.1
Course content	4.3	4.2
Organization	4.4	4.3
Fairness of Grading	4.9	3.8
Instructor Clarity	4.5	4.4
Instructor Concern	4.9	3.8

Note: Maximum rating on each dimension = 5. Overall course effectiveness is computed by averaging scores on each of other dimensions listed. Total number of students responding on Fall evaluations = 143. Total number of students responding on Spring evaluations = 165.

Table 3

Average Student Scores on Final Exams, Papers and Presentations In
PSY101 Presented by Assignment Choice Group

Choice Group		<u>Final</u>	<u>Paper</u>	<u>Presentation</u>
	<u>N</u>			
Quizzes	124	81	78	43
Crosswords	104	79	80	44
Study Guide	129	78	79	43
WWW Book	23	82	75	40
CAI	99	84	77	39
Online Chats	39	82	79	40
Service	102	78	78	40
Classwork	149	78	77	40
No Choice	143	79	76	39

Note: Maximum points possible for Final and Paper =100. Maximum points possible for Presentation = 50. All students enrolled in PSY101 were required to complete these assignments.